The Emergence of Multipurpose Planning
By Martin Reuss, Ph.D.
Office of History U.S. Army Corps of Engineers

Multipurpose planning emerged in the Progressive Era at the beginning of the twentieth century. Its advocates thought the less water "wasted," the better. Rational, scientific management would replace crude political calculations in the allocation of water to cover many different purposes. Scientific efficiency, rather than "willingness to pay," would guide the planning and construction of water projects. Ohio Representative Theodore Burton, chairman of the House Rivers and Harbors Committee, who otherwise championed reforms to reduce the congressional "pork barrel," opposed many of the multipurpose ideas. He believed that if nonfederal interests-states and communities-partially funded projects, marginal projects would be weeded out. He also successfully promoted in 1902 the establishment of a Board of Engineers for Rivers and Harbors within the Corps of Engineers to review the cost-effectiveness and feasibility of rivers and harbors projects recommended by lower level engineer officers. Yet, he opposed proposals that would grant more power to the executive branch, usually through the creation of a board to plan and approve multipurpose projects that addressed a wide variety of needs, including navigation, flood control, irrigation, water supply, and hydropower.

President Theodore Roosevelt embraced multipurpose planning completely. He appointed an Inland Waterways Commission, composed of four government experts, two senators, and two representatives, to propose a comprehensive multipurpose plan for water development. Senator Francis G. Newlands of Nevada proposed yet another commission to carry out the plan. Newland's proposal was Burton's worst fear. This new executive branch commission of experts would oversee the water program and could withdraw funds from an Inland Waterway Fund without further congressional authorization. A majority in Congress, and just about every army engineer, shared Burton's concern, partly because of fear of executive branch growth and partly because the bill threatened Corps domination of federal water projects.. Burton supported a substitute bill specifying that the commission would act only "as authorized by Congress". In 1908, the House overwhelmingly passed the bill, but the Senate killed it. The 1917 Rivers and Harbors Act actually authorized a waterways commission composed of seven presidential appointees. But President Woodrow Wilson never made any appointments, and Newlands' death in 1919 eliminated the act's major champion. In 1920, Congress repealed the waterways commission and instead established a Federal Power Commission.

Some Army engineers objected to multipurpose projects because of constitutional reservations. More raised technical concerns over multipurpose reservoir operations. It was not clear, after all, how to operate a reservoir to respond to both hydropower, which requires a relatively full lake, and to flood

control, which requires that the reservoir be as empty as possible to accommodate upstream floodwater. How would the engineers hold back water for later release to aid navigation as well as release the water to meet irrigation, water supply, and hydropower demands? The difficulties were many, and they remain so. None of this, however, impeded the Corps' performance when Congress gave it the responsibility in 1927 to prepare general multipurpose plans to improve navigation, waterpower, flood control, and irrigation for all the navigable rivers of the United States that seemed capable of supporting hydropower. The resulting so-called "308 reports," named after the House document in which the cost estimates for the reports first appeared, provided basic data for multipurpose development for decades to come.

The most successful coordinated efforts at water control responded to common economic requirements that transcended state borders. These requirements became pressing at the beginning of the 20th century as a result of two unrelated developments: the need for irrigation water in the West and the growing demand for electrical energy throughout the country. The first development called for institutional, technological, and legal arrangements to allocate scarce water supplies throughout the West. The second called for harnessing the nation's rivers to produce hydropower. The two developments coalesced in 1922, when the states in the Colorado River basin (except Arizona, which joined in 1929) signed the Colorado River Compact. Congress ratified the compact in December 1928 and also authorized the building of a great multipurpose dam in the Black Canyon of the Colorado: Boulder (Hoover) Dam. This initiated the era of regional compacts designed to make efficient use of the nation's rivers. Generally, these regional arrangements mirrored hardheaded political realities more than farsighted planning. When Boulder Dam was authorized, few anticipated a string of Bureau of Reclamation dams stretching from the Rocky Mountains nearly to the Mexican border.

Also in 1928, Congress authorized a massive flood control plan for the lower Mississippi River. The 1917 Flood Control Act, the nation's first act specifically for flood control, had authorized federal involvement constructing flood control structures in both the Mississippi and Sacramento rivers. The 1928 act, which came on the heels of a devastating flood the previous year, substantially enlarged federal responsibility for the Mississippi. It authorized the Army Corps of Engineers to build levees and revetments, dredge rivers, construct outlets and formulate plans for flood protection for the entire lower Mississippi Valley. Except for the donation of rights-of-way for tributary levees and floodways, the project was to be built at full federal cost. This was both a technological and political experiment. Here there was no interstate compact to regulate water use, and no formal state approval was required. While the federal government's right to regulate interstate navigation had long been generally recognized, the 1928 Flood Control Act significantly expanded the national government's involvement in planning, implementing, and managing interstate flood control projects.

In the New Deal of Franklin Delano Roosevelt, river basin planning became a social experiment, and the Tennessee Valley Authority-developer of an area four-fifths the size of England-became the prototype. Questions abounded. Did the TVA administer a cultural, geographic, or natural resource region? What objectives should the TVA have and would they threaten traditional institutions and patterns of life? Were the engineering solutions economically efficient and socially beneficial throughout the basin, and did they address both short- and long-term needs? The TVA became a social laboratory, and, while it successfully provided electricity to the region, some of the social experiments initially envisioned were never implemented.

The Corps of Engineers began calculating benefits in the early twentieth century, but it was only in the 1936 Flood Control Act, which established flood control as a proper nationwide federal function, that Congress formally required benefit-cost ratios. The act specified that benefits "to whomsoever they accrue" should be ascertained, a requirement that enabled planners to consider an area much larger (or smaller) than the watershed to justify multipurpose development. The act also specified that benefits must exceed costs before projects could be constructed. In the following decades, various interagency committees and the Bureau of the Budget developed criteria based on classical welfare economics to try to optimize net benefits. Instead of scientific efficiency, which had emphasized maximum water development, planners emphasized economic efficiency. They looked at regional and national costs and benefits, including traditional objectives such as reducing flood damages as well as new concerns, such as preserving ethnic enclaves and, increasingly, reducing impacts on the environment.

The impact of the 1936 Flood Control Act on subsequent federal water resources development can hardly be overestimated. The legislation authorized 211 flood control-projects--principally levees, reservoirs, and drainage channels-in 31 states at an estimated cost of approximately $300 million. Congress passed it in response to the suffering and devastation caused by the spring floods of 1936 and also to alleviate unemployment during the Great Depression. In the absence of floods and economic depression, it is doubtful the legislation would have reached the President's desk. Although the act authorized only single-purpose flood control projects, most of the reservoirs authorized ultimately became multipurpose. The act specified that nonfederal interests contribute the lands, easements, and rights-of-way, hold the government free from damages due to the project, and operate and maintain the works. However, in 1938, Congress passed legislation that effectively eliminated these requirements for flood control dams and reservoirs and for channel improvement projects. As of 1938, then, the federal government generally assumed the full cost of constructing and maintaining both navigation and flood control projects.

To those who still had reservations about the constitutionality of flood control, the United States Supreme Court supplied a definitive answer in 1940 in United States v. Appalachian Electric Power Company. In that decision, the Court ruled

that flood control and watershed development come under the Commerce Clause of the Constitution. The following year, the Court pointed out in Oklahoma v. Atkinson, "There is no constitutional reason why Congress cannot, under the commerce power, treat the watersheds as a key to flood control on navigable streams and their tributaries. . . there is no constitutional reason why Congress or the courts should be blind to the engineering prospects of protecting the nation's arteries of commerce through control of the watersheds." In a case before the Court in 1950, (United States v. Gerlach Live Stock Co.), the justices ruled that "large scale projects for reclamation, irrigation, and other internal improvements" also fell under the constitutional provision to provide for the general welfare. Thus, constitutional questions were effectively laid to rest on these issues after over 150 years of ambiguity and acrimony.

The great dam-building era in American history followed passage of the 1936 Flood Control Act. Construction of Hoover Dam on the Colorado (the largest in the world upon completion), Bonneville and Grand Coulee dams on the Columbia, Fort Peck dam on the Missouri, the Bureau of Reclamation Central Valley Project in California, and several other dam projects had already commenced prior to passage of the act. Fort Peck, Grand Coulee, and Bonneville had been started with emergency appropriations funds at the direction of President Roosevelt in response to the need for unemployment relief during the Depression. Among other projects, the 1936 act authorized the Los Angeles Flood Control System, dams in New England, and a system of dams in the upper Ohio River valley. Subsequent amendments in the next ten years authorized a system of large dams along the Missouri River and more dams on the Columbia. Meanwhile, the Corps also constructed a system of locks and dams on the upper Mississippi River. The Bureau of Reclamation built Shasta Dam in California and numerous dams on the Colorado, culminating in Glen Canyon Dam, completed in the mid-1960s. While some of the reservoir projects were built originally as single-purpose projects, usually for flood control, many became multipurpose, with the water used for a variety of purposes. However, the expense of these projects, coupled with growing demands on the federal treasury, forced a re-evaluation of the federal contribution as the last quarter of the twentieth century began. In the next essay, we will discuss the beginnings of a new partnership between the federal government and nonfederal interests that echoed a relationship going back to the dawn of the American Republic.

This article is based on Martin Reuss, "The Development of American Water Resources, Planners, Politicians, and Constitutional Interpretation," in Paul Slack and Julie Trottier, eds., Managing Water Resources, Past and Present: The Twelfth Annual Linacre Lectures. Oxford University Press, 2004. Forthcoming. Used by permission of Oxford University Press.